Development and Reliability of the Autism Work Skills Questionnaire (AWSQ)

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OBJECTIVE. The Autism Work Skills Questionnaire (AWSQ), a new, comprehensive self-report assessment of a person’s vocational profile, was developed to help produce a good person–job match. This preliminary study was aimed at developing the questionnaire and determining its content validity and internal consistency.

METHOD. Forty-six adults with high-functioning autism spectrum disorder (HFASD), ages 18–39, were interviewed with the questionnaire. A two-phase study was conducted: (1) constructing the questionnaire and determining its content validity and (2) ascertaining internal consistency reliability.

RESULTS. We found that the AWSQ had initial content validity and moderate to high internal consistency reliability (Cronbach’s $\alpha = 0.64–0.90$).

CONCLUSION. The AWSQ can be a useful clinical and research tool in occupational therapy for evaluating work skills of adults with HFASD. Further studies with larger samples and including both typically developing individuals and individuals with HFASD are required to further support the questionnaire’s reliability and validity.


Autism spectrum disorder (ASD) is typically diagnosed in early childhood and has a lifelong course. Despite the development of improved methods of assessment and treatment, the long-term prognosis is grim. Most people with ASD and high-functioning autism spectrum disorders (HFASD) have difficulty participating in everyday life occupations. The International Classification of Functioning, Disability and Health (World Health Organization [WHO], 2001) states that one’s ability to work is significant for one’s health and well-being. However, although approximately 20%–25% of people with ASD have average and above-average intelligence, are capable of working in competitive employment (Howlin, Alcock, & Burkin, 2005), and can work successfully in community businesses (Capo, 2001), people with HFASD face substantial difficulty finding and retaining paid employment (Barnard, Harvard, Potter, & Prior, 2001; Hagner & Cooney, 2005). As a result, many are not employed or are employed in jobs that do not meet their abilities and preferences (Muller, Schuler, Burton, & Yates, 2003). Current surveys in the United States and United Kingdom indicate that 90% of adults with ASD > age 22 cannot gain or maintain competitive employment (Seltzer et al., 2003). In the United Kingdom, only 2% at the low end and 12% at the high end of the autism spectrum work in full-time paid jobs (National Autistic Society, 2010).

By definition, people with HFASD have difficulties in social and communication skills and a restricted repertoire of activities and interests. The disabilities of people with HFASD may affect complex interactions such as those needed in the various stages of finding and retaining a job. The social, communication, and behavioral differences that people with HFASD present may therefore hinder their professional success even if they have excellent technical and vocational skills. Other barriers to employment for this population are environmental, namely employers’ ignorance...
of the characteristics of autism and of potential adaptations to improve the accessibility of people with ASD to the world of work.

However, people with HFASD often possess qualities such as a high level of math and computer skills and memory skills that may be of benefit for work. Many of these people have other traits that employers may find advantageous, such as honesty, reliability, and persistence (Mawhood & Howlin, 1999). Research aimed at determining the needs and strategies that may benefit people with ASD has suggested that they require vocational supports that differ from those recommended for people with other types of developmental disabilities, mental retardation, or both (Muller et al., 2003).

It is often possible to make the working environment accessible to people with special needs, but the needs of those with HFASD are unique to each individual and must be identified by reports of caregivers, the person with HFASD himself or herself, or both. However, vocational support services for people with ASD rarely exist; services that have been implemented mainly support the needs of lower functioning workers in protected employment environments (Inge, Dymond, & Wehman, 1996) and in work site coaching, supplemented by training means of mock-ups of job-related situations (Lattimore, Parsons, & Reid, 2006).

Considering the degree to which therapists are involved in evaluating and planning vocational intervention, a valid and reliable assessment tool can be instrumental in guiding clinicians’ decisions as to what kind of job placement could match the needs of people with HFASD (Baker, 2005; Bliss & Edmonds, 2008). Thus, the information provided by an appropriate assessment tool may serve as the first step in establishing a good job placement as well as an appropriate intervention plan and treatment objectives aimed at retaining the job (Meyer, 2001). A review of the literature showed that no such assessment tool exists.

The purpose of this study, therefore, was to develop the Autism Work Skills Questionnaire (AWSQ), which addresses the vocation-related strengths and weaknesses of adults with HFASD, and to assess its internal consistency reliability.

Method

Research Design

The study was performed in two phases: (1) construction of the questionnaire and determination of its content validity and (2) determination of the internal consistency reliability of the questionnaire’s domains. Approval for the study was obtained from the ethics committee of the Israeli Ministry of Welfare, Ministry of Education, and the Hebrew University. Participants and their parents or guardians signed the informed consent forms.

Phase 1: Construction of the Questionnaire and Determination of Content Validity

The AWSQ was developed specifically to assess adults with HFASD who have completed high school as well as adults who are ready to begin their vocational life, are already working, or have worked in the past. Its purpose is to form the basis of an individual’s vocational profile, hence facilitating a good person–job match. The questionnaire addresses personal and educational data, employment history, work habits and styles, independence in work and studying, work-related strengths and weaknesses, previous obstacles to work, preferred physical and social environment, routine daily activities, interpersonal skills, and future goals.

The first phase of AWSQ construction began with the selection of the questionnaire items by the authors, all of whom are experts in the area of ASD, rehabilitation assessment, or both and have >20 yr of clinical and research experience. They deliberated over what data were needed to assess work-related strengths and weaknesses in people with HFASD; in doing so, they referred to the definition of ASD according to the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM–IV–TR; American Psychiatric Association, 2000), the current literature on adults with ASD, and structured interviews with 6 adults with ASD regarding their work histories and the obstacles they encountered in obtaining and retaining a job. The original pool of items identified through this process included 117 items that were formulated with clear and understandable terminology, encompassing the main strengths and weaknesses of people with ASD that could potentially affect their vocational success. These items were divided into six domains that relate to the ability to work.

For each item, the participants with HFASD were asked to rate their performance on a 5-point Likert scale ranging from 5 (very high) to 1 (very low); higher scores indicated better performance. Some items were worded for reverse coding.

Next, content validity was assessed on the basis of the experts’ evaluation of the AWSQ items (Benson & Clark, 1982). The original 117-item questionnaire was reviewed by two expert consultants and three vocational rehabilitation specialists experienced in working with people with ASD. They were asked to evaluate whether these 117 items would provide the information needed to assess work readiness and abilities and then to rate the clarity of each item. They further assessed, through a table of specifications, whether each remaining item related to one of the six domains previously identified. After the specialists’ input, and to shorten the questionnaire, 39 of the questions that were identified as unclear or too complicated, repetitive of other questions, or irrelevant to assessing work-related abilities were omitted. The remaining 78 questions constituted the final version of the questionnaire.

To define the relatedness of each item to a domain, the agreement between the specialists was divided into three levels: full agreement (i.e., percentage of items in a domain on which all people agreed), partial agreement (i.e., percentage of items in a domain on which 3–4 people agreed), and poor agreement (i.e., percentage of items in a domain on which <3 people agreed). A partial to full agreement of 86%–100% was obtained for five of the six domains (work habits, 86%; independence in work and studying, 100%; sensory responses and needs, 100%; routine daily activities, 100%; and interpersonal skills, 93%). A lower agreement of 67% was obtained for the working style domain. The specialists further discussed each question for which no partial or full agreement was
obtained in the table of specifications until an agreement was reached as to which domain it best reflected.

Next, in a secondary qualitative pilot evaluation process, 3 people with HFASD and 3 of their parents were asked to respond to the 78 questionnaire items with respect to themselves or their children. According to the feedback obtained in the 1-hr-long interviews, the items were easy to understand, and the questionnaire reflected its prescribed objective and provided a thorough profile of the participants’ work-related strengths and weaknesses.

After this process, the final product contained nine subscales, of which three address personal and educational data and information regarding the person’s work-related past and present. The remaining six subscales focus on work-related skills and consider the following six domains: work habits, working style, independence in work and studying, sensory responses and needs, routine daily activities, and interpersonal skills. The number of items in each domain vary; thus, the means of the scores in each of these six domains constitute the final scores (Table 1).

**Phase 2: Internal Consistency Reliability.**

After the AWSQ was constructed, we examined the internal consistency reliability of the questionnaire’s domains.

**Participants**

The study sample consisted of a convenience sample of adults who had previously been diagnosed with HFASD according to DSM–IV–TR criteria. Their diagnosis was validated for this study with the Social Communication Questionnaire (Berument, Rutter, Lord, Pickles, & Bailey, 1999; Rutter, Bailey, & Lord, 2003). Forty-six people (36 men, 10 women) with HFASD ages 18–39 yr (mean age = 25.32 yr, standard deviation = 6.24) participated in the study. All participants had at least 10–12 yr of education.

Participants were recruited from Beit Ekstein centers, which provide housing, employment, and educational services for people with special needs. All participants were in transition from an educational setting to employment or had been employed in the past and needed a job. Participants with known serious illnesses, injuries, physical disabilities, or intellectual disability were excluded from the study.

**Procedure and Data Analysis**

The AWSQ was completed during individual interviews with the participants by the second author (Anat Ben Meir), an experienced clinician with intensive experience working with people with ASD. After data collection, descriptive statistics (means, standard deviations) of all domains of the AWSQ were calculated, and Cronbach’s α coefficient was used for internal consistency reliability of the domain scales.

**Results**

Internal consistency reliability of the questionnaire domains ranged from moderate to high (Cronbach’s α = .65–.90), representing acceptable levels. The domains with the highest reliability values were work habits (α = .89), routine daily activities (α = .90), and independence in work and studying (α = .79). These domains seem to be clearer and more objective to the participants, resulting in higher internal consistency between the items. The α values of the other domains were moderate, ranging from .65 to .69, which may indicate more variable responses to the more subjective items. No items were deleted because this would not have improved the level of reliability (see Table 1). The AWSQ was originally developed in Hebrew and underwent a standardized translation process into English after validation.

**Discussion**

The development of the AWSQ is a first step in addressing an urgent need to enhance the ability of therapists and educators to assess work-related skills to assist people with HFASD in finding jobs that meet their needs. The AWSQ derives from the perception of participation as an indicator of function and health, also reflected by the ability to engage in appropriate vocations (WHO, 2001). Moreover, reliable and valid assessments that specifically relate to the work-related strengths and weaknesses of those with HFASD are lacking. This study established the AWSQ’s content validity by expert qualitative evaluation, and internal consistency reliabilities of the six work-related questionnaire domain subscales were found to range from moderate to high (Cronbach’s α = .65–.90). Thus, the study results suggest that the AWSQ reliably informs therapists about vocationally related issues for people with HFASD in the various work domains (work habits, working style, independence in work and studying, sensory responses and needs, routine daily activities, and interpersonal skills).

The questionnaire domains with the highest reliability values were work habits, routine daily activities, and independence in work and studying, indicating that most of those items do reflect the respective domain. Indeed, the domains of work

### Table 1. Autism Work Skills Questionnaire: Subscales, Example Items, Number of Items and Range of Scores, Means and Standard Deviations, and Cronbach’s α

<table>
<thead>
<tr>
<th>Domain</th>
<th>Example Item</th>
<th>Items in Each Domain (Range)</th>
<th>M (SD)</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work habits</td>
<td>Follows directions regarding work assignments</td>
<td>12 (12–60)</td>
<td>4.31 (.50)</td>
<td>.89</td>
</tr>
<tr>
<td>Working style</td>
<td>Easily adjusts to changes at work (e.g., changes in job assignment or environment)</td>
<td>10 (10–50)</td>
<td>3.36 (.58)</td>
<td>.65</td>
</tr>
<tr>
<td>Independence in work and studying</td>
<td>Can learn a new subject by self from written material</td>
<td>10 (10–50)</td>
<td>3.34 (.86)</td>
<td>.79</td>
</tr>
<tr>
<td>Sensory responses and needs</td>
<td>Bothered by artificial lighting?</td>
<td>13 (13–65)</td>
<td>3.56 (.63)</td>
<td>.68</td>
</tr>
<tr>
<td>Routine daily activities</td>
<td>Fits clothing to the work requirements</td>
<td>14 (14–70)</td>
<td>3.98 (.78)</td>
<td>.90</td>
</tr>
<tr>
<td>Interpersonal skills</td>
<td>Likes to cooperate with colleagues at work</td>
<td>19 (19–95)</td>
<td>3.94 (0.40)</td>
<td>.69</td>
</tr>
</tbody>
</table>
habits, routine daily activities, and independence in work and studying, which describe a person’s behavior, were shown to be easier to respond to and received more consistent responses than sensory needs or interpersonal skills. However, expert content validity of sensory needs or interpersonal skills suggests high agreement regarding the domains that their items reflect. These two domains, which relate to one’s relationship with self and others, require a stronger sense of self-awareness. Therefore, one may assume that the moderate internal reliability of these domains may reflect the difficulty people with HFASD have in responding to items that require comparing themselves with others and with social norms in a highly reliable matter, in contrast to more objective reporting about themselves. This assumption needs to be further studied because it may be that the lower correlations indeed indicate lower reliability; therefore, this portion of the questionnaire requires further studies.

Caregiver reports have long represented the major source of information about children and adults with ASD. Some advantages of using reports from caregivers are their familiarity with the child, their ability to comprehend the questions, and their extensive observations of the frequency and timing of behaviors (Grills & Ollendick, 2002; Hanna & Rodger, 2002; Rogers, Hepburn, & Wehner, 2003). Parents’ and caregivers’ reports are also used to avoid potential problems that sometimes arise when children and adults with disabilities are the information providers, such as misunderstanding of questions because of low cognitive levels, a tendency to be influenced by situational factors, and barriers encountered because of deficiencies in language development and abilities (Cremeens, Eiser, & Blades, 2006; Grills & Ollendick, 2002). Some of these barriers may apply specifically to people with ASD, including those who are high functioning, because they are known to have limited social interaction abilities and comprehension of social requirements and are prone to interpreting social demands differently from other people (Baker, 2005). The aim of the AWSQ is to gather firsthand information, assuming that people with ASD are able to reliably report their abilities (e.g., follow safety rules at work) and their preferences (e.g., has to work in silence).

Indeed, this study’s results may suggest that people with HFASD are able to report their performance and preferences in relation to others (e.g., interpersonal skills) with only moderate reliability. However, the high reliability of AWSQ domains that relate to a more objective self-description (e.g., work habits), based on interviews with people with HFASD, may suggest that adolescents and adults with HFASD are able to report such skills and abilities in a very reliable way. This finding supports recent trends in health care that have resulted in emphasizing people’s self-reporting of their experiences, health care, and needs (Cremeens et al., 2006). The self-report method of gathering information also ensures that information about subjective experiences and internal feelings is not overlooked and, in most cases, can be reported by the people concerned, in addition to their parents’ or caregivers’ reports or clinical observations.

Limitations and Future Research

This initial study serves as a pilot only because the number of participants was small. For the AWSQ to be appropriate for distribution to the broad occupational therapy audience, it would be prudent to further establish the questionnaire’s validity by examining it with a larger population of people with ASD as well as with other clinical and typically developing populations. Ongoing studies focus on (1) collecting data from a group of typically developing people matched on age, gender, and education with people with HFASD to establish the AWSQ’s construct validity and (2) a 9-mo follow-up of a group of people with HFASD who were placed in jobs according to the AWSQ results and assessment of their work behavior and satisfaction compared with those of a control group in jobs with no prior evaluation.

After data are collected from larger samples, further recommendations are to perform factorial analyses to confirm the domain assignment (specifically, the working style domain, which had the lowest internal consistency and rater agreement). Further studies to substantiate the AWSQ’s construct validity are recommended to demonstrate its usefulness as a clinical tool.

Implications for Occupational Therapy Practice

The results of this study have the following implications for occupational therapy practice:

- The AWSQ provides guidelines and information on domains, abilities, and difficulties of persons with HFASD.
- When using assessments that examine vocational skills of people with HFASD, therapists need to consider self-report by the person with HFASD in addition to the report of a parent or guardian or a therapist when interpreting results.

Conclusion

The AWSQ, a self-report questionnaire for people with HFASD, was found to be easy to use, comprehensive, and reliable. This study represents the first stage in the development of a comprehensive intervention program to assist in adapting vocational placements for people with HFASD. The information that this tool provides may be useful in deciding what kind of job placement may meet the specific person’s needs and what kind of environment and support will meet his or her needs as a worker. The results strengthen the contention that adolescents and adults with HFASD are capable of reporting their own abilities and needs.

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References


